REMARKS

Claims 1-7 are all the claims pending in the application.

Applicants note that a number of editorial amendments have been made to the specification and abstract for grammatical and general readability purposes. No new matter has been added.

I.   Claim Objections

The Examiner objected to claims 4-6 due to minor informalities. Applicants have amended the claims in a manner to overcome the objections. Accordingly, Applicants kindly request that the objections to the claims be reconsidered and withdrawn.

II.   Claim Rejections under 35 U.S.C. § 103(a)

The Examiner has rejected claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over Ichioka (SPIE Vol. 3137) in view of Sun et al. (Journal of the Optical Society of America). Applicants respectfully traverse this rejection on the following basis.

Claim 1 recites the features of subjecting a second-harmonic, which is generated by satisfying a phase matching condition in a nonlinear crystal, to time-to-space conversion through an inverse one-dimensional Fourier transformation optical system so as to be converted into a one-dimensional space distribution; and subjecting the time-to-space converted one-dimensional space distribution to filtering with a time-frequency filter provided on a filter plane of a one-dimensional space frequency filtering optical system. Applicants respectfully submit that the combination of Ichioka and Sun does not teach or suggest at least this combination of features recited in claim 1.

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Regarding the Ichioka reference, Applicants note that this reference discloses an optical system in which a transmitted signal is converted into a one-dimensional spatial signal with a diffracting grating G and a one-dimensional Fourier transform optical system L_5 (see pg. 225 and Fig. 3b). The converted signal passes through a one-dimensional spatial window filter g(x-x') that is tilted by 45 degrees (see pg. 225 and Fig. 3b). The spatial signal is then one-dimensionally Fourier transformed into the input image signal by a TF transform optical system L_6 (see pg. 225 and Fig. 3b).

Thus, while Ichioka discloses an optical system in which a converted one-dimensional spatial signal is passed through a spatial window filter, and is then transformed into the input image signal by a transform optical system, Applicants respectfully submit that Ichioka does not disclose or suggest the features of subjecting a second-harmonic, which is generated by satisfying a phase matching condition in a nonlinear crystal, to time-to-space conversion through an inverse one-dimensional Fourier transformation optical system so as to be converted into a one-dimensional space distribution; and subjecting the time-to-space converted one-dimensional space distribution to filtering with a time-frequency filter provided on a filter plane of a one-dimensional space frequency filtering optical system, as recited in claim 1.

Regarding the Sun reference, Applicants note that this reference discloses an optical system which utilizes a nonlinear optical crystal (see Fig. 4a). As explained in Sun, the nonlinear optical crystal is oriented to achieve type I phase matching for generating of a second-harmonic field (see pg 1162, last paragraph of the right hand column). As depicted in Fig. 4a of Sun, the optical system includes a grating, a first lens, the nonlinear crystal discussed above, and a second lens which converges onto an image plane.

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Thus, while Sun discloses the use of a nonlinear crystal that is able to achieve phase matching for the generation of a second-harmonic field, Applicants respectfully submit that Sun does not disclose or suggest the feature of subjecting a time-to-space converted one-dimensional space distribution to filtering with a time-frequency filter provided on a filter plane of a one-dimensional space frequency filtering optical system, as recited in claim 1.

Further, regarding the Sun reference, Applicants note that this reference is not concerned with converting a time signal to a two-dimensional signal, but instead, merely provides for time-to-space conversion. Accordingly, Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art to provide the optical system of Ichioka with the nonlinear optical crystal as disclosed by Sun.

In view of the foregoing, Applicants respectfully submit that the combination of Ichioka and Sun does not disclose, suggest or otherwise render obvious all of the features recited in claim 1.

In particular, as noted above, Applicants respectfully submit that the combination of Ichioka and Sun would not suggest the features of subjecting a second-harmonic, which is generated by satisfying a phase matching condition in a nonlinear crystal, to time-to-space conversion through an inverse one-dimensional Fourier transformation optical system so as to be converted into a one-dimensional space distribution; and subjecting the time-to-space converted one-dimensional space distribution to filtering with a time-frequency filter provided on a filter plane of a one-dimensional space frequency filtering optical system.

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Accordingly, Applicants submit that claim 1 is patentable over the cited prior art, an indication of which is kindly requested. Claims 3, 4 and 7 depend from claim 1 and are therefore considered patentable at least by virtue of their dependency.

Regarding claim 2, Applicants note that this claim recites the features of subjecting a second-harmonic, which is generated by satisfying a phase matching condition determined depending on an angle formed by the incident one-dimensional frequency light distributions, to time-to-space conversion through an inverse one-dimensional Fourier transformation optical system so as to be converted to a one-dimensional space distribution; converting the time-to-space converted one-dimensional space distribution into a one-dimensional space frequency distribution by a one-dimensional Fourier transformation optical system; subjecting the one-dimensional space frequency distribution to filtering by a time-frequency filter; and subjecting the light wave thus obtained to time-frequency expansion through an inverse one-dimensional Fourier transform optical system so as to obtain an intensity distribution of a two-dimensional light distribution.

As noted above, Ichioka discloses an optical system in which a converted one-dimensional spatial signal is passed through a spatial window filter, and is then transformed into the input image signal by a transform optical system, and Sun discloses the use of a nonlinear crystal that is able to achieve phase matching for the generation of a second-harmonic field. Applicants respectfully submit, however, that the combination of these references does not disclose, suggest or otherwise render obvious the above-noted combination of features recited in claim 2.

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Further, as noted above, as the Sun reference is not at all concerned with converting a time signal to a two-dimensional signal, but instead, merely provides for time-to-space conversion, Applicants respectfully submit that it would not have been obvious to one of ordinary skill in the art to provide the optical system of Ichioka with the nonlinear optical crystal as disclosed by Sun.

In view of the foregoing, Applicants respectfully submit that claim 2 is patentable over the cited prior art, an indication of which is kindly requested. Claims 5 and 6 depend from claim 2 and are therefore considered patentable at least by virtue of their dependency.

III. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may best be resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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